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Rising Stocks during Lockdown Economic Recessions: Explaining the Phenomenon

Abstract

Whilst facing an economic recession, stock prices have been rising consistently since late March of 2020, which has been viewed by many as paradoxical and has led some to consider that the stock market does not represent the real economy. The aim of this paper is to offer a simple, coherent explanation which is capable of showing *why* this is actually a phenomenon to be expected during the implementation of lockdown measures. The theoretical tool through which this is accomplished is the Life Cycle/Permanent Income Hypothesis and its consumption smoothing implications. I show that the exceptional inability to smooth consumption under current circumstances has been the cause of unprecedented increases in savings which find the stock market as one of their natural destinations.

1. Introduction

The evolution of stock prices over the last twelve months has been viewed as paradoxical in the face of regular patterns between the stock market and output fluctuations. In a period of steep decline in economic activity stock prices have been rising consistently without favorable data in their usual determinants, leaving many to believe that the stock market does not represent the real economy (see *e.g.*, Chen *et al* (2020), Blankenship (2020), Capelle-Blancard *et al* (2020)). The aim of this paper is to explicitly explore a simple and coherent mechanism through which the “paradox” is logically solved and the data is satisfactorily fit.

Considering the reaction of stock market prices to other negative output shocks, two major predictions could initially be made regarding their behavior in this recession. Firstly, we would expect high levels of volatility due to the appearance of a particular kind of shock that is new to participants in the market; secondly, we could expect decreasing stock prices as that is the tendency for economic recessions, even when their origin is not directly related to the financial markets themselves.

In terms of initial volatility, predictions would be confirmed. If volatility is measured by market jumps, defined by Baker *et al* (2020) as variations in stock prices of more than 2.5% over the course of one trading day, then the 22 days ranging from February 24th to March 24th of 2020 represented the most volatile period of such duration since at least 1900, with 18 market jumps. Also, and illustrative of the novelty factor at play, no market jump had ever been linked by newspapers to a virus or disease, including during the 1918 Spanish flu.

When it comes to the overall trend of stock prices, however, the regular pattern of recessions was not followed. March 24th of 2020 represented a turning point from which the S&P500, *e.g.*, rose by around 71% by March 12th of 2021. This unusual circumstance has generated a lot of debate and attempts at explanation. Economists realize this cannot be the consequence of regular determinants of stock prices, such as GDP growth, earnings, expectations for the corporate share of output, short-term interest rates, among others since most have been unfavorable.

Therefore, the most plausible factor for explaining this phenomenon became the strong action of central banks, who announced a range of measures including policy rate cuts, liquidity supports, swap lines and asset purchase schemes (Capelle-Blancard *et al*, 2020). Still, and even though their contribution cannot be denied, there remains a large fraction of variations in stock prices to be explained after the expected effects of these policies are considered, as noted by Cox *et al* (2020), who also point out to the fact that effective action has come short of the announcements made, and yet markets have not retracted from their recovery trend.

Difficulties arise when analysis related to the current economic recession follow one of two processes: either treating it as a pandemic crisis and thus trying to extrapolate economic consequences of previous pandemics as a way of gaining insight into the near future; or treating it as a regular negative economic shock and using modern analytical tools as a way of explaining present economic phenomena and predicting households’ responses to it.

On the one hand, categorizing this recession as pandemic induces the economist to unfair comparisons with what must be considered distinct events economically-wise. It is a fact that this recession found its origin in the COVID-19 pandemic, but the health policies undertaken at present, namely non-pharmaceutical interventions (NPIs), are the most rigid ever experienced, as is amply recognized (see, *e.g.*, Rayner (2020) for the UK). This means that some economic events experienced in the aftermath of previous pandemics, such as increases in the wage rates due to high mortality or decreases in profit rates related with spikes in the capital to labor ratio (unlike, *e.g.*, in a war where both labor and capital decrease) (Òscar Jordà *et al*, 2020), are not to be

expected in the aftermath of this recession. However, since NPIs do cause a drastic reduction in economic activity in the short-term, other events that were not registered in other pandemics are to be expected now, which includes the rise of stock prices, as will be explained.

On the other hand, simply making use of modern macroeconomic models through techniques of determining relevant behaviors based on household optimization without considering the peculiar present circumstances that condition those behaviors also leads to reasoning errors. There is a fundamental difference between the stylized facts of normal economic shocks and this particular shock that, when taken into account, explain bigger, and even paradoxical at first sight, differences, namely concerning the stock market. This distinction corresponds to the household's response to an unexpected fall in income, which, as is put more clearly in the next section, tends to be that of smoothing the loss of income as reflected on consumption over time. The implementation of NPIs and, consequently, the inability of households to freely choose their time path of consumption, is responsible for a drastic increase in savings which is capable, on its own, to provide part of the explanation as to why stock prices are rising and why this is usually not the case in other recessionary circumstances.

This paper is organized as follows. Section 2 provides literary review regarding the stylized facts of the economic cycle and how they relate to households' consumption and savings decisions as put by the Life-Cycle/Permanent Income Hypothesis, thereby predicting a scenario of what would have happened to stock prices if NPIs were not imposed. In section 3, I explain the mechanism through which NPIs distort the reoccurrence of those stylized facts and why this has a powerful effect on stock prices. Since the analysis is not specific to any country, I provide data for the US economy as an example and way of testing the explanation presented. Section 4 concludes.

2. Literature Review

2.1 Stylized facts of the economic cycle and stock market fluctuations

In the same way that Kaldor (1957) identified stylized facts of economic growth, so have others worked on finding patterns relating to the business cycle. In the tradition of Lucas (1977) this consists in analyzing the co-movements of different aggregative time series, more specifically in measuring how deviations of output from its trend relates to deviations of various economic variables around their respective trends. In this paper, our focus is turned towards the responses of households in terms of consumption and savings decisions and of stock market price fluctuations, since other variables are of no major relevance to the arguments made.

Empirical studies performed by Kydland and Prescott (1990) for the US, Blackburn and Ravn (1992) for the UK, and Bjornland (2000) for Norway, among various others, largely agree in terms of the results relevant for our purposes. Consumption, measured only by that of non-durables and services (since the purchase of durable goods can be categorized as investment because it acquires a level of utility that goes beyond the time period of when the purchase was made), is pro-cyclical but less volatile than output, *i.e.*, consumption varies in the direction of output but less than proportionally to it. In the US, for example, the relative volatility of consumption in relation to output was estimated to be 0.84 for the period ranging from 1954 to 1989.

This means that households choose to keep consumption levels stable and tend to spread the incidence of unexpected income shocks on consumption over time, thus meaning that income losses are not proportionally reflected by a loss of consumption in that same time period. This

increase in households' average propensity to consume during a negative income shock necessarily has to be financed by falling levels of savings or by other forms of income such as the liquidation of assets. On the other hand, investment and consumption of durables are considerably more volatile than output and also vary in the same direction as output, with investment in the US being 8.3 times as volatile as output and consumption of durables being 5 times as volatile as output. It should be taken into consideration that savings are commonly referred to in the literature as an important determinant of the two latter variables mentioned.

Turning to the stock market, two approaches are valid to empirically analyze its behavior along the business cycle. The first is to replicate that which was already done for consumption and investment, labeled as the Lucas tradition; the other, following the NBER tradition, consists in simply categorizing periods of expansion and contraction of output and then analyze how stock prices evolve during each temporal category. This allows us to get insights into whether recessionary periods coincide in both variables and, if so, which of these registers a sharper decline.

The NBER method has been used by Avouyi-Dovi *et al* (2005), who arrived at the conclusion that, although specifically for the US, there is a significant concordance between the level of real activity and stock prices. When the same authors used the Lucas method, the results were similar. Besides the pro-cyclicality of stock prices, it should also be noted that, unlike what was registered for consumption, the magnitude of variations are usually more than proportional to those of output.

The table below shows how stock prices have varied in total from the beginning to the end of every economic recession ranging in the period between 1971 and 2009. Since there are many stock market indices which represent different samples of the stock market and may be differently affected in each recession, three were chosen (S&P500, Nasdaq Composite and DJIA) and a principal component analysis was run, resulting in a vector capable of explaining 98% of total variations in the data.

	gy (%)	gPC1 (%)
Q1 1974 – Q2 1975	-3,2	-36,7
Q2 1980 – Q3 1980	-2,7	0,4
Q3 1981 – Q4 1982	-3,7	-9,9
Q3 1990 – Q1 1991	-2,0	-1,8
Q2 2002 – Q4 2004	-0,7	-6,2
Q1 2008 – Q2 2009	-4,5	-42,5

Table 1- Real per capita GDP and stock prices cumulative growth rates during recessions. Sources: U.S. Bureau of Economic Analysis, MacroTrends.

With the exception of the 1980 recession, stock prices always decreased in such periods. Then, with the exception of the 1990-91 recession, stock prices always decreased more than proportionally to output by considerable margins, showing the higher volatility of the stock market comparatively to real activity.

2.2 Consumption Smoothing under Normal Circumstances

Now knowing that in a regular negative income shock felt by households, consumption decreases less than proportionally to income and investment and stock prices tend to decrease more than

proportionally to income, we shall look for a simple and coherent theoretical tool for explaining such observations, which presents itself in the works of Modigliani and Brumberg (1954) and Friedman (1957), and is referred to as the Life Cycle/Permanent Income Hypothesis.

Firstly, brief context regarding this hypothesis shall be provided. Keynes (1936) argued that by mere observation of human behavior one could conclude that consumption is a function of income, increasing when income increases but less than proportionally so. Kuznets (1946) noted that empirical evidence showed Keynes's description to be wrong in the long-run, because consumption varied proportionally to income in that time horizon. In the short-run, however, Keynes was right. This means that for short periods the marginal propensity to consume is lower than the average propensity to consume for a given household and for long periods both marginal and average propensities to consume are equal to some fraction of income. This set in motion the "Kuznets paradox" which came to find satisfactory resolution in the Life Cycle/Permanent Income Hypothesis.

Modigliani and Brumberg (1954) write in terms of wealth whereas Friedman (1957) does so in terms of permanent income, but both works point towards the same relevant conclusion, which is that a rational and utility maximizing household tends to distribute his lifetime income equally among all time periods, since marginal utility is decreasing. Current income plus expectations regarding all future incomes form a view of the household's total lifetime income, which may be divided by all time periods to give a permanent income, from which the household consumes a constant fraction of. So, permanent income, despite not being a real and commensurable financial flow, nonetheless determines those which actually are so, such as consumption and savings.

Taken to its extreme logical implications, this means, as Hall (1978) noted via the Random-Walk Hypothesis, that the time-path of consumption is fully independent of the time-path of income. Relating this to the regular negative income shock analyzed in this section, this means that the household, acting as a consumption smoother, and holding an idea of what his permanent income is, realizes that the shock is temporary and therefore the fall in permanent income is not as large as that in current income, and since it is a proportion of the first which he consumes, his consumption does not fall proportionally to the latter, thereby increasing his average propensity to consume. Consumption smoothing may be described by the following equation:

$$\frac{dC_t}{dY_t} = \frac{dC_t}{dY_t^p} \frac{dY_t^p}{dY_t}, \quad (2.1)$$

Where C_t is consumption in time period t , Y_t is current income and Y_t^p is permanent income. Since, as already explained, $\frac{dC_t}{dY_t^p} = 1$ and, in a temporary income shock, $\frac{dY_t^p}{dY_t} < 1$, then $\frac{dC_t}{dY_t} < 1$.

Mainly due to liquidity constraints and short-sightedness of individuals, reality does not fully replicate the Life Cycle/Permanent Income Hypothesis and its Random-Walk implication, as shown by various writers (see, more specifically, Flavin (1985)). However, it is still a relevant and generally accepted model for how households behave, even if less than perfectly so. While the only stylized facts that it explains directly are those of consumption of non-durables and services along with consumption of durables and savings, the fact that the major incidence of income losses fall on savings (as a residual of consumption) can in turn offer an explanation for variations in stock prices.

Note that even though it is not commonly mentioned in the literature as a determinant of stock prices (because it normally already manifests the effects of other determinants), savings are in fact one of its major determinants because increased levels of savings, as long as not hoarded as a consequence of increases in the demand for money, represent an inflow of capital into the financial markets, namely the stock market. As with all goods and securities, if demand increases

then so do prices, and vice-versa. So, if in order to smooth consumption households decrease their savings levels or liquidate assets such as stocks, it is expected that stock prices will decline. Therefore, the Life Cycle/Permanent Income Hypothesis is a clear tool for understanding why consumption and savings decisions made by households have an influence on stock market prices, in addition to the other determinants more regularly mentioned in the literature.

Note also that this is not an explanation for why stock prices fall in every recession, as many recessions have had their origin connected to the stock market in the first place, but rather an explanation of the mechanism through which a negative shock in households' income alone contributes to the lowering of stock prices under normal circumstances. It is from the pool of total savings that some fraction of it is directed into the stock market. Therefore, before turning to the next section it is important to grasp that if that pool gets considerably larger, then even if the fraction directed to the stock market is reduced in face of uncertainty, more funds are still destined to it in absolute terms and prices rise.

3. NPIs and the Absence of Consumption Smoothing

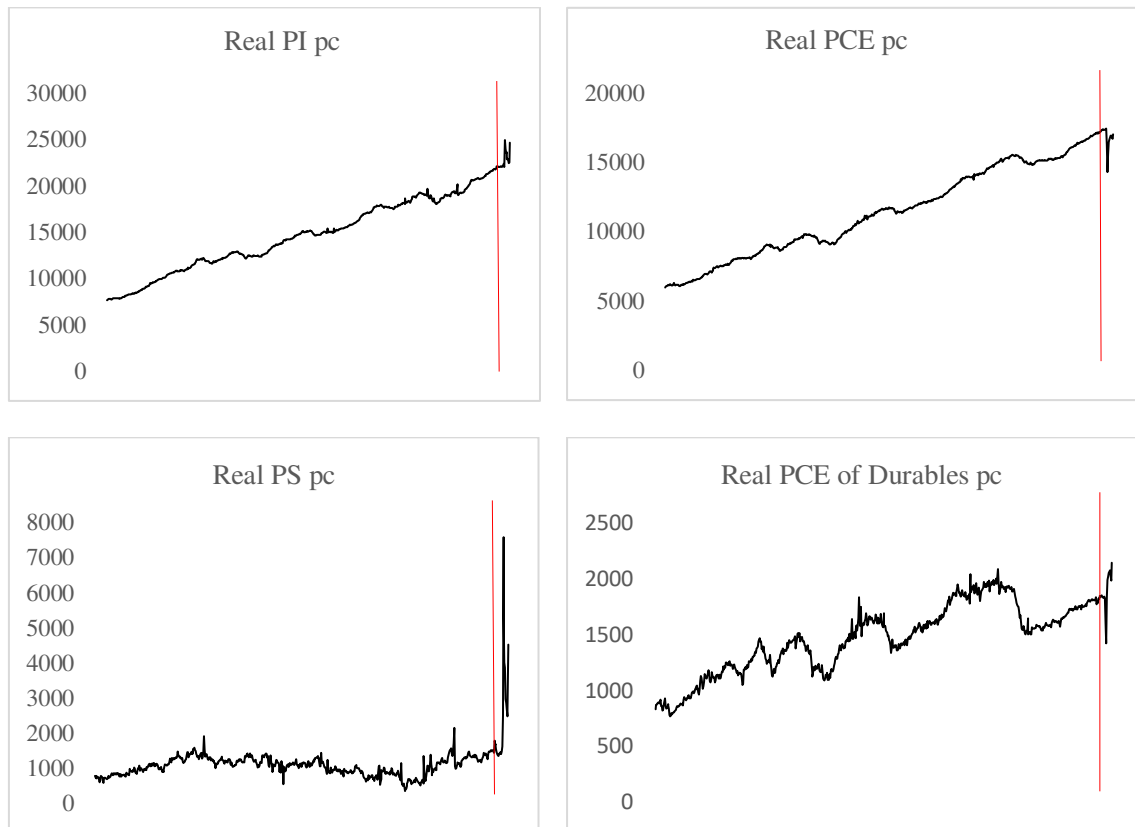
In order to compare a lockdown economic shock to the regular income shock previously analyzed, we first need to hold a definition of what a lockdown recession is. It occurs when, to prevent negative externalities associated with the laboring and consumption activities of individuals infected by a contagious disease without knowledge of such (Eichenbaum *et al.*, 2020), governments and health authorities implement NPIs which reduce mobility and human contact and, consequently, reduce trading activities. In such a scenario, individuals are allowed to leave their residences only for specific purposes, therefore being forbidden by law to maintain previous consumption levels, *i.e.*, to perform their preferred reaction of consumption smoothing.

The implications of applying this reasoning to equation (2.1) are immediate and leave a clear image of the difference between a lockdown shock and a regular one. In relation to $\frac{dY_t^p}{dY_t}$, it is still the same, *i.e.*, inferior to unity because the NPI measures are perceived as temporary. However, $\frac{dC_t}{dY_t^p} = 1$ no longer applies because consumers do not have that choice. Indeed, households are temporarily unable to consume that constant fraction of permanent income which they would otherwise consume.

The natural hypothesis that follows from this observation is that the major incidence of the temporary loss of income now falls on consumption instead of savings, and perhaps not only that but also that the decrease in consumption is so extreme under NPIs that it may not only be more than proportional to the loss of income, but even superior to it in absolute terms. If this is the case, then savings would increase despite falling incomes, which implicates that so long as households do not opt to hoard these additional savings, there is an inflow of capital in the financial markets contributing to falling interest rates and increasing stock prices through spikes in bank deposits and in the demand for securities in general, respectively. Also, given the close relationship between savings and the purchase of durable goods, we would also expect the latter to actually increase, as long as the possibility of purchasing them despite the lockdown is real (*e.g.*, the online purchase of a Television).

The next step, then, must be to find data on personal consumption expenditures (PCE, which corresponds to consumption of non-durables and services), consumption of durables (PCE of durables) and savings (PS) as way of determining whether predictions regarding the lockdown

economic shock are correct, and also of bank deposits (BD) as a proxy for understanding whereas savings are being hoarded. Personal income (PI) is also included to keep other variables in perspective. These data for the US were obtained from the U.S. Bureau of Economic Analysis and are presented in the graphs below. All variables were divided by the population and the decimal form of the consumer price index in order keep them in per capita and real terms, with data taken from the U.S. Bureau of Economic Analysis and the U.S. Bureau of Labor Statistics, respectively. The sample period for all variables is from January of 1959 to January of 2021 and all data are in a monthly basis.



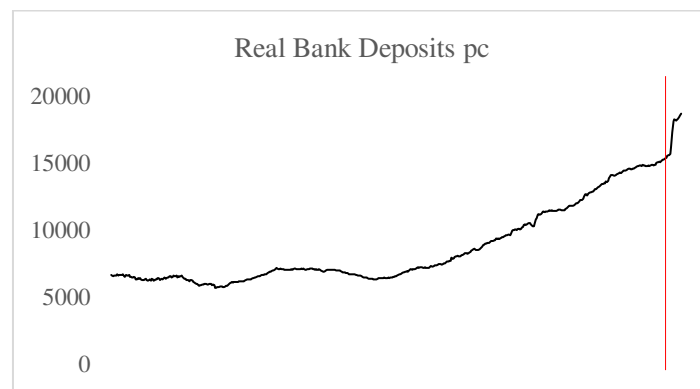
Graph 1- Data for USA variables. Sources: U.S. Bureau of Economic Analysis, U.S. Bureau of Labor Statistics.

Firstly, it should be noted that personal income actually rose in the US due to stimulus payments under the CARES Act started on April 15th of 2020 and the Paycheck Protection Program which was signed into law on April 24th of 2020 (Finck *et al*, 2020). In no way does this affect our analysis. Under regular circumstances, the Life Cycle/Permanent Income Hypothesis would predict the temporary increase in income to lead to a less than proportional increase in PCE, as usually happens (*e.g.*, following the Economic Stimulus Act of 2008, as shown by Shapiro *et al* (2009)). However, in a lockdown recession we expect PCE to decrease despite the stimulus, which is what happened. In fact, real consumption per capita registered the steepest decline of the whole sample period, being 17.8% lower in April of 2020 than in February, which compares to the previous maximum decrease of 3.3% in levels of June of 2009 in relation to April of 2008, and it is still below pre-lockdown levels.

In relation to savings, which is the fundamental variable for the arguments made, the data are even more convincing. We are experiencing the largest increase ever recorded, amounting to 410.9% higher savings in April of 2020 than in January of 2020. Up until the end of the sample

period every month still registers levels at more than double the previous ones. Initially, this was not reflected in increases in the consumption of durables as predicted, perhaps due to uncertainty or because some durable goods also have to be bought at the store. Nonetheless, after an initial decrease it has been rising ever since April and is now at levels around 17% higher in relation to the immediate pre-lockdown period.

With the differences in stylized facts confirmed, the main question is whether a potential increase in the demand for money resulting from uncertainty has caused savings to be hoarded and therefore not allocated to the financial markets. One effective way of finding this out is by looking at bank deposits data. If uncertainty had led to high enough levels of hoarding, then additional savings would not have caused bank deposits to increase substantially, and we would not be justified in thinking that these extra savings were allocated to the stock market instead. On the other hand, if bank deposits have indeed increased substantially as well, then uncertainty was not a potent enough factor to fully outbalance the effect of increased savings and households have allocated some of the unprecedented levels of savings into the financial markets, including the stock market. Our hypothesis is confirmed, as shown in the graph below. Data for bank deposits were obtained from the Board of Governors of the Federal Reserve System and the sample period ranges from January of 1973 to January of 2021, also in a monthly basis.



Graph 2- Data for Bank Deposits. Source: Board of Governors of the Federal Reserve System.

Once again, the largest spike of the sample period occurs in the direction predicted, now with an increase of 19.2% between January of 2020 and January of 2021. The analogy is insightful. Increased levels of confidence towards financial institutions cannot explain increased deposits because the economy is undergoing a recession; an increase in the rates of interest cannot explain increased deposits because interest rates were lowered; a trading off of stocks for deposits cannot explain increased deposits because stock prices have been rising for almost a year. This line of reasoning could be continued for other regular determinants of bank deposits, but the lesson would continue to be the same: bank deposits are increasing simply because savings have drastically increased as a result of NPIs and deposits happen to be a natural destination for savings, as is the stock market.

4. Conclusions

Under the initial assumption that stock prices increase when the demand for stocks increases, *ceteris paribus*, the purpose must be to understand why an increase in their demand has been occurring. Usual determinants which dictate the demand for securities as by inducing households to tradeoff consumption for their purchase does not explain why it could be the case now that stock prices are rising.

The conclusion is that there are times when stock prices' variations need not necessarily be connected only with expectations for the securities purchased when saving (or the amount of bank deposits need not be connected only with expectations for interest rates, *e.g.*). Rather, consumption and savings decisions related with the desire to smooth consumption may at times exert a strong enough positive or negative influence without the merits of securities being the main factor weighing in on the decision to buy or sell them. In a negative income shock, for example, the potential dissaving of households performed to keep consumption smooth is, on its own, enough to drive stock prices down, to which other determinants contribute to the same direction. Too often, economists are led to think that only the latter are relevant. The current recession exposes the problem of reasoning in these terms, as now those determinants are unfavorable and stock prices are rising. Going back to fundamentals of supply and demand and understanding why savings have increased gives us a satisfactory explanation for the increase in stock prices.

This also shows why stock prices and real activity are interconnected in the specific context of this recession. Obviously, the economy is also facing a supply shock, so it is losing wealth because it is losing production. Imagine though, as a thought experiment which facilitates understanding, that only a demand shock was occurring and people would still work in the same way. Then, the temporary increase in savings would serve to direct funds to companies in different ways, via increased deposits which lower the rate of interest, via the stock market which gives capital to firms, among others. Savings would then be the mechanism through which the structure of production would adjust itself towards investing and producing for the future, when the demand shock was no longer a factor and keeping firms alive while doing so.

The implications for public policy are a topic of further research which may be explored using this paper's explanation as a starting point. For example, knowing the stock market is more protected in this recession than in others, there is a higher risk that stimulus programs using the stock market as their vehicle may lead to an over appreciation of stocks and induce the creation of future bubbles.

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